



# **RESEARCH INTO THE EFFECTIVENESS OF ENVIRONMENTAL MANAGEMENT SYSTEMS**

**FINAL**

**A report to  
US Environmental Protection Agency, Region I, New England**

**August 2002**

***The New Hampshire Department of Environmental Services***

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A report to  
US Environmental Protection Agency, Region I, New England

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ACKNOWLEDGEMENTS		
	EXECUTIVE SUMMARY	1
1.	INTRODUCTION	4
2.	PROJECT DESCRIPTION	
	2.1    Introduction	7
	2.2    Training	8
	2.3    DES ISO 14000 Advisory Committee	8
	2.4    Multi-State Working Group on EMSs	9
3.	PROJECT ACTIVITIES	
	3.1    Recruitment and retention of participants	11
	3.2    Changes in expectations	12
	3.3    Input from participant firms	14
	3.4    DES Advisory Committee	16
	3.5    Other DES EMS activities	21
4.	RESULTS AND LESSONS LEARNED	
	4.1    General Lessons and Results	23
	4.2    Small Businesses	24
	4.3    Specific Notes on New Hampshire Participating Firms	25
	4.4    Summary of National Research Results	27
5.	SUMMARY	29
BIBLIOGRAPHY		

## APPENDICES

- A. Grant app. work plan
- B. Descriptions of the other states' projects
- C. NH's EMS law & the required reports to the legislature
- D. Description of EMS Implementation Training Program
- E. Roster and Minutes of DES Advisory Committee meetings
- F. Blank Cooperative Agreement Between DES & Participating Company



## **EXECUTIVE SUMMARY**

In 1997, the New Hampshire Department of Environmental Services (DES) responded to a grant request by EPA Office of Wastewater Management (OWM) which was targeted on:

1. Encouraging the voluntary use Environmental Management Systems (EMSs);
2. Researching the effectiveness of EMS use; and
3. Examining the use of positive incentives by government for organizations that use EMSs

DES proposed selecting firms at a single industrial park; assisting these firms in developing an EMS conforming to the ISO 14001 model; and, observing performance changes resulting from implementation of such systems. DES was partially successful in reaching these goals. At the same time, the NH legislature required the DES Commissioner to recognize the ISO 14001 standard and take actions to disseminate information on the standard and determine whether certification to the standard ensured compliance with existing legal or regulatory requirements of the DES. Further, a Multi-State Working Group (MSWG) working on the intersections of EMS use and public policy was started at about the same time. DES participated in MSWG's efforts.

DES recruited five companies at the Pease International Tradeport, in Portsmouth and Newington, NH) who began training in the late spring of 1998 and later in that year three additional companies located near the Tradeport. Training on EMS implementation was provided to these companies through the middle of 2000.

An Advisory Committee was formed to disseminate information on EMSs and their use and to assess possible government incentives for the use of EMSs that might be considered.

Ten states, including NH, participated with other parties in establishing a MSWG data protocol designed to measure the effectiveness of EMS application, an effort that was also funded by OWM.

Of the firms that initially showed interest in participating, several dropped out during the process. Early in the process, a warehousing firm, decided that their environmental impacts were so minimal that developing an EMS would not be worthwhile. Later, a powder coating firm dropped out since the manager was a) running two shifts; and b) approaching management from a "fire fighting" approach. Another firm simply did not participate and their Cooperative Agreement with DES was terminated. By the Fall of 1999, five firms were participating in the process.

A number of general conclusions can be drawn from the experience:

1. An organization intending to implement an EMS must accept the Plan-Do-Check-Act management style; otherwise the EMS becomes a single project.
2. Financial payback on the effort of EMS implementation may be generally short and, based on a limited sample, appears to be mostly related to non-regulated areas such as energy use.
3. Small businesses typically lack the resources to undertake EMS development and their owners/operators have limited management training.
4. The greatest progress among participants was in those with a clear and active commitment from upper management and where staff throughout the organization became involved in the EMS development process.
5. One of the participants experienced difficulties due to their focus on lean manufacturing and just-in-time delivery requirements. Focus was at the shift level and broader management planning and follow through was found difficult to achieve.

EMSs, as a process, are still in an early evolutionary stage. As previously noted, company size and management focus is critical with respect to putting an EMS into place. Smaller companies, and wholly production-oriented companies, face greater difficulties in establishing EMSs.

There are limitations in the most commonly used EMS standard, ISO 14001. Information developed in the process is not necessarily made available to the public, which is a key public policy issue. Details of how compliance with regulatory requirements is assured through EMS use remain vague. The US system of registering EMSs to the ISO 14001 standard contains a high degree of variability.

Nonetheless, DES encourages the development of EMSs as a means for organizations to galvanize energies and direct them toward a higher level of environmental and ultimately economic performance. There is a pay back, but as with all pay back calculations, it must be measured in terms of the required investment and in competition with other capital and operating expenses. The expected benefit in this case is often the difficult to evaluate "avoided cost." It is clear that each and every company can not or will not be willing to make the considerable investment required to establish an EMS.

This DES effort is part of a national research project referenced in the body of the report and found at <http://ndems.cas.unc.edu/>. Selected conclusions from the work are:

- Corporate policy matters and organizational culture are powerful influences on how and to what extent an EMS progresses.



- Regulatory expectations are the strongest external influence on EMS implementation, although for businesses internal drivers outweigh any external drivers.
- External stakeholders are rarely invited into the EMS development process since the ISO 14001 standard requires only that the organization's policy be made publicly available.
- The scope of an EMS may or may not cover an entire facility
- There is great variation in how environmental activities, aspects and impacts are categorized, described and ranked.

EMSs are of growing significance and will continue to gain ground. Environmental matters, even if limited to regulated matters, are sufficiently complex that an organized system appears to be the only way to reliably achieve good performance. However, motivation to have an EMS varies from organizations that adopt one as part of a comprehensive approach to environmental affairs while others adopt it with reluctance because of demand to do so by a dominant client or perhaps as a result of an enforcement settlement. Given this breadth of motivation, results are uneven.

While DES recognizes that many jurisdictions have implemented programs to use EMSs as a tool to achieve better environmental performance, resource constraints indicate that no such new program can be started. DES for the foreseeable future intends to use its existing assistance programs to encourage EMS use.

## **1. INTRODUCTION**

Throughout the 1990's, the New Hampshire Department of Environmental Services (DES) moved away from an enforcement-only approach to environmental protection by encouraging activities aimed at achieving regulatory compliance and environmental improvement through a combination of compliance assistance, pollution prevention outreach, innovative targeting strategies, and a strong regulatory presence. This multi-pronged and multi-tiered approach met many of DES's environmental protection goals as articulated in its Strategic Plan, Performance Partnership Agreements with the US Environmental Protection Agency (EPA), and other documents.

By the late 1990's, companies in the United States and elsewhere had accumulated significant experience with managing their environmental impacts and liabilities. Businesses began to recognize the limitations and costs associated with the traditional reactive and compliance-focused management of the environmental aspects of their operations. Business leaders recognized that their environmental impacts often resulted in significant uncontrolled and unquantified liabilities. Therefore, they began to take proactive, systems-based approaches that moved their companies toward more sustainable and cost-effective ways of doing business, using pollution prevention methods and integrating environmental concerns more fully into the corporate structure and operations. They realized that better performance in environmental areas could be used to drive better performance in the marketplace. To achieve this performance, a business management tool was developed through standards-making bodies to help business effectively handle their environmental affairs - the Environmental Management System, or EMS.

An EMS is a comprehensive, organized and documented management system aimed at achieving full control over, and maximum performance in, an organization's environmental affairs. In the early 1990's, several EMS standards were promulgated by national standard making bodies. These standards did not agree with each other in all details. To address the conflicts between the national standards, and seeing a business opportunity, the International Organization for Standardization (ISO) in Geneva, Switzerland began the process of making a consensus international standard for environmental management systems. Their EMS standard, ISO 14001, was finalized in September 1996. While DES acknowledges that other EMS standards can be used, this report is written around the ISO 14001 standard, as it is the standard which is most used in the US at this time.

Environmental agencies in the United States, especially the Environmental Protection Agency (EPA), followed this standards development process closely. EPA participated in the process of creating the ISO 14001 standard. Other agencies at the state level have become more and more aware of the private sector's move toward use of EMSs, as they have seen the behavior of at least some of their regulated parties change.

The tools available to environmental agencies tend to reflect the times in which the specific programs were established. Through the 1970s and 1980s, and into the 1990s, environmental concerns were often not effectively addressed by businesses, which led to relationships between the private sector and the environmental/regulatory agencies that were adversarial, and costly in terms of dollars and time spent. A command-and-control system arose. The agencies relied almost solely on strict regulation and litigation to achieve the goals set by their overseeing legislatures.

The US framework of laws and regulations is focused on single issues or media – water quality, air quality, hazardous waste management, etc. This framework is reflected in organizations, responsibilities and budgets, which can cause administrative problems in addressing issues that cross media/legislative boundaries. Problems associated with the gasoline additive MTBE are a recent example: a well-meant and successful attempt to solve air quality problems inadvertently led to water contamination problems. With a media-specific framework built into the structure of most environmental agencies, a holistic systems approach is often difficult to achieve. The private sector is less handicapped in this sense, they *must* deal with all their environmental issues or face consequences, and so they are becoming more systematic in their approach.

The older, single-media, “command-and-control” style of environmental protection has had many successes and many important environmental gains have been made. However, the newer environmental challenges that the agencies and the public they serve face at the turn of the century require new problem-solving approaches. The old way of doing business may be ineffective in making future progress.

In theory, a facility that adopts and effectively implements an ISO 14001 EMS should, in the long run, comply with all environmental regulations without the threat of enforcement since the standard requires procedures for identifying and complying with regulations. Further, a comprehensive EMS may drive better environmental performance in areas that are not regulated. While the environmental agencies want to encourage performance beyond the regulatory minimums, and in non-regulated areas, they have had difficulty finding the appropriate means to do so.

A change in the private sector toward better and more comprehensive environmental performance beyond the regulatory requirements raises the possibility of the agencies being able to re-focus their efforts. The hope is that if the agencies can identify firms with EMSs in place as better performers, resources could then be re-prioritized away from the high-performing facilities and toward facilities that require closer scrutiny.

At this time, the environmental agencies do not have the resources to oversee all the environmental impacts of all regulated parties using the traditional tools. Since it does not appear likely that agency budgets and staff will grow to the extent necessary, to triple perhaps, other means are sought. Further, DES and other agencies have learned over the years that the confrontation implicit in command-and-control regulation tends to raise its own opposition. These agencies are learning that an assistance-first

philosophy will often get more results at lower cost to the agency, and thus to the public, while leaving the enforcement option available to use when needed.

In basic terms, the environmental regulatory system (loosely defined) is a system essentially designed to modify business behaviors to avoid negative impacts to public health and the environment, and to avoid costly clean-ups in the future. Any effective behavior modification system has rewards and punishments. However, environmental command-and-control regulation (as used in the United States) has been a behavior modification system designed mostly with punishments in mind, with very few positive rewards. It must be understood in this context that withholding a punishment is fundamentally different from offering a positive reward. This has led to a scarcity of tools for the agencies to use to address different problems. Policy-research institutions<sup>1, 2</sup> and policy-making branches of the government<sup>3</sup> have spent significant resources over the last five to ten years addressing this issue.

Thus, there are several interrelated issues that can be addressed by focusing on EMSs as a tool:

- The need to manage environmental problems previously not addressed to have an impact beyond the current set of regulations and regulated areas;
- The desire to obtain environmental performance beyond the regulatory minimums;
- The perception that the command-and-control regulatory system may not be able to adequately address certain problems not contemplated by the existing regulatory system, at least not as the only tool available for all parties;
- The agencies' resource limitations; and,
- A desire to use a systems approach to pull all environmental management efforts into a cohesive and holistic package, while at the same time there is a new systematic management tool for environmental affairs.

All these factors drive an intense interest by environmental agencies in the role of EMSs in protecting public health and the environment.

However, there is a significant missing link. This missing link is real data or knowledge on the performance of firms who use EMSs. Is it really better than the old way? In what way is it better? Or is it just a green veneer on old practices? This report describes DES's effort, one of a set of efforts that various states have begun, to find out.

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1 Especially see: *Environment.Gov: Transforming Environmental Protection for the 21<sup>st</sup> Century*, November 2000, National Academy of Public Administration, Washington, DC

2 *Managing a Better Environment: Opportunities and Obstacles for ISO 14001 in Public Policy and Commerce* March 2000, J. Morrison et al, Pacific Institute, Oakland, CA

3 Especially see: *Aiming for Excellence: Actions to Encourage Stewardship and Accelerate Environmental Progress*, July 1999, USEPA

## **2. PROJECT DESCRIPTION**

### **2.1 Introduction**

In January 1997, the Office of Wastewater Management (OWM) at EPA Headquarters published a Federal Register notice requesting competitive grant applications from states for the purposes of encouraging the voluntary use of EMSs, especially the ISO 14001 EMS; researching the effectiveness of EMS use; and examining the uses of positive incentives by environmental agencies for companies that use EMSs. DES responded with an application, and in April 1997 EPA notified DES that they had been accepted for funding. DES's grant application work plan is attached as Appendix A.

DES's proposal was to select firms at a single industrial park, assist those firms in developing an ISO 14001 EMS, and observe what performance changes resulted from implementation of the system.

During the same time frame, two other groups took actions affecting this proposed work. The NH Legislature amended the statute describing the duties of the DES Commissioner, requiring him to recognize the ISO 14001 standard and to take certain actions to disseminate information on the standard, and perhaps most importantly, to "Determine... whether ISO 14000 certification of certain entities ensures adequate compliance with existing standards or requirements established by the department."<sup>4</sup> The work conducted under this grant allowed DES to fulfill those requirements. The actual legislation is in Appendix C of this report.

Also, a Multi-State Working Group on EMSs (MSWG)<sup>5</sup> began a major research effort to determine the effectiveness of EMS, looking for changes in performance in areas of rates of compliance with regulations, their existing management systems, environmental performance, pollution prevention activities, consideration and involvement of stakeholders in environmental decisions, and economic performance (costs and benefits). This effort was made in cooperation with the same EPA office that solicited the grant applications mentioned above. Most of the successful applicants (but not DES at that time) were MSWG members. The data protocols developed by MSWG became the research metrics for all of the states receiving EPA grants.

During the project period, the project managers of the various state projects met twice a year with EPA and research staff to compare notes and progress and to address issues that had arisen. DES was represented at all these meetings.

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<sup>4</sup> Chapter 295, Laws of 1997

<sup>5</sup> See <http://www.mswg.org>

## **2.2 Training**

DES competitively procured the services of a consulting trainer to provide assistance to participating companies. Environmental Science & Engineering, Inc. (“ESE”)<sup>6</sup> of Nashua, NH was selected.

DES recruited companies at the Pease International Tradeport (“Tradeport”, the former Pease Air Force Base), and five companies began training in the late spring of 1998. In late 1998 and early 1999, DES recruited three additional companies in the same region of the state as the Tradeport.

The training was designed such that part of the ISO 14001 standard was introduced to participants at a meeting held at DES offices at the Tradeport. The participants then returned to their workplaces and either performed the appropriate planning task, or implemented the appropriate part of the system. Additional assistance at each company’s location was made available. This incremental approach, with homework, is common in EMS implementation training. It is intended to enhance each company taking ownership of the EMS. Training sessions continued through the spring of 2000. The results of the training are outlined in Chapter 3. A description of the base training program, from the contract documents, is in Appendix D.

A second type of training was also offered. Eight-hour seminars were offered to give an introduction to the EMS concept, and specifically to ISO 14001, to DES staff and to members of the DES ISO 14000 Advisory Committee (see sec. 2.3). About 15% of DES staff attended, as did a few staff from another state agency, and almost all of the membership of the Advisory Committee attended.

This second training program was very valuable by increasing awareness of the EMS concept among state staff and the various groups represented on the Advisory Committee.

## **2.3 DES ISO 14001 Advisory Committee**

Two of the original grant requirements were to 1) test acceptance of the EMS concept in the stakeholder community; and 2) assess possible regulatory incentives and flexibility that might be appropriate for organizations that use EMSs. A stakeholder committee, called the DES ISO 14000 Advisory Committee (“the Advisory Committee”) was recruited to help address these issues by providing outside opinions and oversight, as well as to keep interested parties informed as to what DES was doing. The Advisory Committee included representatives from the business, academic, and environmental communities, and government bodies in NH. A full Advisory Committee roster is included in Appendix E.

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<sup>6</sup> This firm changed ownership twice during the project. For some of the time ESE was known as QST Environmental, at a later time QST reverted to the ESE name.

So that discussions could proceed from a common level of knowledge, and to spread information on EMS use further, an eight-hour seminar on EMSs was made available in the Spring of 1998 to members of the Advisory Committee. Some members attended a daytime session at DES's office, which was primarily intended for DES staff. Other members attended evening sessions, which were made available specifically for those who could not devote a full workday to the other seminar.

The first meeting of the Advisory Committee was in April 1998. The Advisory Committee met six times, with the last meeting to date in June 2000. The discussions are summarized in Chapter 3; the minutes of the Advisory Committee meetings are in Appendix E.

At the fifth meeting, in November 1999, the Advisory Committee requested that DES develop a program that would offer incentives to companies that show they are managing their environmental affairs effectively, using the presence of an EMS as a key part of the evidence that the company is doing so. This concept is discussed further in various sections of this report.

## **2.4 The Multi-State Working Group on EMSs**

In 1996, a Multi-State Working Group on Environmental Management Systems (MSWG) was formed to provide a forum for federal and state agencies, non-governmental organizations, and representatives from industry and academia to examine the public policy implications of environmental management systems, particularly ISO 14001. MSWG has continued to meet quarterly to discuss issues related to environmental management systems and ISO 14001 as well as the use of EMSs in innovative regulatory programs. MSWG also holds larger annual national workshops on these topics.

As noted in section 2.1, in 1997 MSWG established the beginnings of a data protocol to measure the effectiveness of EMS use. OWM granted money to a consortium of the Environmental Law Institute of Washington, DC, and the University of North Carolina at Chapel Hill to develop data protocols, house the resulting database, and prepare reports to the public.

After receiving its own grant, DES was made aware of this process. OWM proposed that all ten participating states use the MSWG data protocols, on the theory that a national-scale database of 50 to 100 firms, overseen by a major university, would yield much more useful data than smaller separate state-specific databases. This database is now referred to as the "National Database on Environmental Management Systems" (NDEMS). DES agreed to this approach, and participated in the process of finalizing the data protocols. DES has since become a full member of MSWG.

NDEMS is a public database. As such, the information is made available to the public<sup>7</sup>.

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<sup>7</sup> See <http://ndems.cas.unc.edu/>

However, the firms participating in the various state projects are assisting the agencies' research, and the project managers (and the participating firms) felt strongly that the participating firms should be protected from nuisance attention brought about solely by virtue of their participation in the projects. Also, while information on how incidents of non-compliance are found and addressed is key to finding out how EMSs work, this information which is often considered sensitive by the firms. The project manager group and the research staff expended a great deal of time and effort resolving the conflict inherent in this matter. It was agreed that the various agencies would address incidents involving substantive environmental threat or harm themselves as if there was no special relationship with the participating firm, but that the research staff would not become involved in this. Only information aggregated so that incidents should not be traceable to individual facilities is given to the public through NDEMS.

It should be understood however, that in most cases, and certainly in DES's case, each participating firm is in closer contact than usual with the agencies involved because of their participation. None of the states have waived legal requirements for participating firms.

NDEMS uses three different data protocols. The first, and longest one is the Baseline Protocol, which describes the company and its environmental performance over a three-year period, to establish a starting point. Using a three-year baseline period also at least partly addresses the issue of study controls. The second is the EMS Design Protocol, which describes how the company designed and implemented its specific EMS. The third is the Update Protocol, in which the company is asked what has changed in the time since the last protocol was submitted. The first two data protocols are generic, and are available on the web at <http://ndems.cas.unc.edu/>. The Update Protocols are customized, but a base version is available at the website. The facility is shown the data from previous submittals, and they are asked to make changes as appropriate.

As of the summer of 2002, results from more than 60 organizations' Baseline Protocols, more than 50 EMS Design Protocols, and almost 40 Update Protocols had been completed through the QA process. Research papers are being written. Papers completed can be found at the website mentioned above.

It should also be mentioned that vigorous attempts were made to recruit control facilities from outside of the state projects. This effort did not bear fruit, partly due to budget restraints with the research staff. Facilities in the control group, by virtue of their 'control' status, could not use the substantial in-kind assistance of the state project managers. Efforts to get information from companies with EMSs, but who were not in state programs, bogged down. Efforts to get environmental performance information from companies that do not have EMSs was unsuccessful – in hindsight it seems obvious that companies with no EMSs would not manage environmental information.



### **3. PROJECT ACTIVITIES**

#### **3.1 Recruitment and Retention of Participants**

Beginning in late 1997, DES's project manager began meeting with firms located at the Pease International Tradeport, which is a growing industrial development at the former Pease Air Force Base, near Portsmouth on New Hampshire's seacoast. The purpose of the meetings was to both educate the firms on the EMS concept and to recruit participation in DES's pilot project. Seven firms showed an active interest in participating in the DES project. Five of these seven firms ultimately decided to participate, and they signed Cooperative Agreements with DES describing their participation in the project. A sample Cooperative Agreement is attached as Appendix F.

The first training workshop for the participating facilities was held in May 1998. This workshop covered the EMS concept in general, ISO 14001 more specifically, and focused on development of a company's environmental policy per ISO 14001 Section 4.2. Following this workshop, one participant dropped out of the project, having decided that their environmental impacts were so minimal that developing an EMS would not be worth the effort.

In this particular case, a warehouse operation, the person who convinced corporate management that they should get into the EMS project was not the same person who was sent to the first workshop. This new person was instructed at the last minute to attend the training, and he did not have any orientation to the EMS process. He recommended to corporate management that they drop out because their warehouse had no environmental impact. While the environmental impacts of a small warehouse are not the same as a manufacturer, the last minute personnel change was likely a cause of this firm's decision to drop out at this point. A lack of acceptance of the significance of environmental concerns was also a factor. During the recruitment phase of the project this was a concern mentioned several times by this firm. In the event, one person's belief in the importance of environmental affairs was insufficient to keep the company in the project.

Later in 1998, a second firm dropped out. This firm was a powder-coating firm employing about 25 people. They work on a job-shop basis, on two shifts. The manager of the firm, who was attending the EMS training sessions, decided that he could not handle the expanded workload of EMS development in addition to all his other duties.

In this instance, the manager understood that his shop had environmental impacts, and he sincerely wanted to address them. However, his management style was personal and hands-on. He "fought fires" as they arose; he tried to run both production shifts personally. While he had success running his business, he did not have an

understanding or acceptance of the management methods generally referred to as “Plan-Do-Check-Act” or TQM, which aim to produce continuous improvement. It seems that this hands-on management style, with little delegation of authority, is not conducive to developing an EMS.

In late 1998, DES recruited additional firms to participate in the project. A meeting with the Pease Tradeport tenant group showed that no more firms at the Tradeport were likely to participate, so recruitment was widened to the entire New Hampshire seacoast area. Several firms expressed interest, and three signed Cooperative Agreements with DES. These three firms, all ISO 9000 certified manufacturers, started EMS training in the spring of 1999.

One of these three new firms failed to attend workshops and showed no interest in participating in the project, so DES terminated that Cooperative Agreement. Therefore, by the fall of 1999, five firms were participating. They were:

First group (start early 1998):

1. **NH Air National Guard, 157<sup>th</sup> Air Refueling Wing (NHANG)**, a military unit still operating on the former air base. Their EMS covers all NHANG operations.
2. **Pease Development Authority (PDA)**, the landlord for Pease International Tradeport. Airport and maintenance activities are covered under their EMS.
3. **Fenris Technology Research, Inc. (Fenris)**, a very small firm, operating at Pease, engaged in research and development of analytical laboratory equipment. Their EMS covers all operations.

Second group (start early 1999):

4. **Venture Holding Corporation (Venture)**. An ISO-9000 certified manufacturer, producing plastic molded body parts for the automotive industry. Their EMS covers all operations.
5. **Foss Manufacturing Company, Inc. (Foss)**. An ISO-9000 certified manufacturer, making non-woven fabric products. The automotive industry is a major customer. Their EMS covers all operations.

By the fall of 1999, each group was at a similar stage of EMS development, so training for the two groups was merged.

### **3.2 Changes in Expectations**

When DES’s project was conceived, there were some early expectations that later proved unrealistic. The first of these was the expectation that the project could result in

a generic template usable by small businesses in general to develop an EMS. This turned out to be a mis-guided idea. The ISO 14001 standard itself is the template. Beyond that, the vast differences between different business sectors make development of a small-business-specific EMS template impossible. However, sector-specific EMS templates seem quite possible, and some of these are being developed by others.<sup>8</sup>

Another unrealistic expectation had to do with the pace of EMS development. The original concept was to move the firms through their training in a six to seven month time frame, thus leaving more time in the (originally conceived) two-year project to observe changes in the firms' environmental performance. All the firms, but especially the first three firms, ended up moving through the process at a rate much slower than envisioned.

One of the early tasks in EMS implementation is analysis of a firm's products, services and activities to determine how each of these interact with and impact on the environment, and to rank the impacts. This analysis is one of the key value-added items of an EMS, bringing an understanding of a firm's operations that was not possible before the analysis. However, the concept is new to most people, the nature of the analysis is not specified in the standard, and getting started can take some effort. Also, once started, most often the effort becomes surprisingly absorbing, and all of the firms involved in DES's project spent much effort in doing the best possible analysis of their environmental impacts and ranking them in the best possible way. While this may have added some value, it cost time, and was a key factor in the training schedule becoming protracted.

More detail on the behavioral aspects of each participating firm is provided in Chapter 4 of this report.

Another factor in the delays was the non-enforceable nature of the Cooperative Agreements. The firms involved are assisting DES in doing research on EMSs, and there were no sanctions for not progressing as anticipated. DES could not force the firms to go faster than they were willing to go. However, it may be that this delay did not impede the overall research, because of the next mistaken expectation, which relates to the nature of a *national* research effort.

As noted in Section 2.4, EMS projects in ten different states are sending common data to NDEMS. Data protocol development took longer than expected, in part due to the process of getting ten states, a federal agency, a university and an environmental group to agree on both strategy and details; and also in part due to personnel turnover at the University of North Carolina. The EMS Design Protocol was not available until mid-1999, and the Update Protocol was not available until early 2001.

In addition to issues related to protocol development, the data protocols themselves, especially the Baseline Protocol, contain very large quantities of data. Therefore review

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8 e.g., EPA's Design for the Environment Program,  
[http://www.epa.gov/opptintr/dfe/pwb/case\\_studies/case8/](http://www.epa.gov/opptintr/dfe/pwb/case_studies/case8/)

and synthesis of the incoming data protocols required an unexpected amount of staff processing time at UNC and ELI. Quality control reviews of incoming data protocols, and making certain that each company was comfortable with the data, added time to the project. Also, it turned out that assembling the computer database to house and use the data was a major unanticipated task and UNC had to find additional skilled staff to build the actual database structures.

As of mid-2002, NDEMS is now able to report on changes in companies' environmental performance as a result of EMS use. This is three years later than originally anticipated.

In part, these delays can be attributed to the newness of the EMS concept. In early 1997, the environmental agencies were very interested, as they still are, in determining out what actual environmental performance an EMS brings to a company. This turned out to be a far more complex question to address than it first appeared, so the actual effort needed to address the issue was greater than expected.

### **3.3 Input From Participating Companies**

After several requests, only two of the participating companies provided comment on the project. These comments focused on the training program by Environmental Science & Engineering, Inc. The comments are provided verbatim<sup>9</sup> here:

NH Air National Guard:

*" --Overall methodology and instruction were excellent. Instructor was very good (especially all the review sessions Gary had to do to get our minds back to where we had left off)*

*--Gary (Wilson) was a very effective teacher, and we appreciated that he came to the Guard to provide specific training to all our Supervisors at the inception of the program.*

*--Handout materials were very good and the ISO book (ISO 14000 Answer Book, Sasseville, Wilson & Lawson, John Wiley & Sons, 1997) helped refresh our memories when we needed it.*

*--We believe it was worthwhile for us to go through the process to look at ourselves. It was an eye opener as to how our organization in all its activities affects the environment.*

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<sup>9</sup> Only a very few grammatical corrections were made to these comments, none of which change the meaning.

*--We believe that the ISO process, if we were further along, would have helped us in our EPA multimedia inspection in such areas as awareness of potential problems.*

*--ISO 14000 is clearly a way to improve our regulatory compliance...it's just finding the time to make it a priority.*

*Finally, we would be willing to share our experience with other companies who may be considering going through the process to give them a quick view as to our experience.*

(ed.: Since these comments were provided in June 2000, Air National Guard personnel made a presentation at an MSWG meeting on how they are implementing their EMS.)

Venture Industries:

*"This facility expected to be able to participate in the series of workshops more fully than it did. Here are the reasons (excuses) as to why the workshops were not as helpful as expected:*

- 1. The process as presented proved too theoretical for us. The identification of environmental aspects and ranking of impacts was performed by a consultant (another consultant, hired by Venture corporate headquarters), and not by plant employees because the procedure was too academic, the criteria too subjective, and the product was too irrelevant to the average employee.*
- 2. The plant has a high turnover in both production and management personnel, consequently, there is less continuity in our staffing than would be expected.*
- 3. The corporate culture has embraced "continuous improvement" which often means "constant change".*
- 4. The facility is production driven, and while there have been attempts to empower the hourly production employees to manage aspects of their work, the facility is not staffed to the point where employees can be relieved from their production line duties regularly enough to attend project training or implementation meetings. These production demands prohibit team members from spending time to work on project assignments between meetings. Scheduling and staffing difficulties move people from shift to shift as needed, resulting in spotty participation in project-related efforts.*
- 5. Use of management personnel to contribute to an ISO14001 implementation team is not currently practical, since labor shortages have left three departments (molding, assembly and packaging) temporarily without managers. Supervisors are experiencing stress from working excessive hours, often including weekends. Several other technical support positions are unfilled, thanks to regionally high employment.*
- 6. The facility has spent the last 10 years attending to environmental issues, and much of the obvious improvements had been made prior to three years ago:*

- *Previously un-permitted wastewater treatment facility was permitted, operated for 10 years, then abandoned in favor of connecting to a newly available public sewer system.*
- *Wastewater pretreatment facilities were previously constructed to enable the on-site wastewater treatment facility to function properly under the permit.*
- *Past NPDES permit was closed and re-issued as a stormwater only permit before the EPA's stormwater program was final. Consequently, the facility has a fully regulated NPDES permit for only a stormwater discharge, causing numerous sampling, analysis, and quality control burdens for little benefit.*
- *Hazardous wastes were previously shipped to scores of TSDFs at a total annual cost of over \$1million. Waste minimization, pollution prevention, segregation, and competitive bidding of disposal and trucking contracts have brought this down to 15% of that.*
- *The possible cost savings from ISO14001 implementation are still large, but will require much greater systemic involvement. The low-hanging fruit had already been picked.*
- *Our customers seem to pay lip service to ISO14000, yet are unwilling to involve our input in product design, saying, in essence, "We know the product is stupid, and that the design is overly complex, but that's what Madison Avenue says the customer wants, so try to make it in the most environmentally responsible way." For example, while everyone agrees with Henry Ford's sentiment, that it is most efficient to offer one color of vehicle, the market now somehow supports over 50 shades of gray offered by Ford, GM and DaimlerChrysler. Every time our paint lines have to change colors, there is unnecessary waste. While automotive plastics were developed to make vehicles lighter and more fuel efficient, the market drove the car companies into building huge, wasteful SUVs. Government has not educated the public about long-term goals and environmental responsibilities. The way ISO14000 is going, it will be immune from having to do the dirty work too.*
- *Large, multinational companies seem to develop ISO14000 programs for the advertising benefits. Our company, as a job shop, never deals with the ultimate consumer, so our involvement has no intangible paybacks to tip the scales. "*

### **3.4 DES ISO 14000 Advisory Committee**

As described in Section 2.3 of this report, a stakeholder group, the DES ISO 14000 Advisory Committee ("the Advisory Committee"), was assembled. The group met six times between June 1998 and June 2000. Minutes of the meetings are included as Appendix E. Discussions are summarized below, by topic.

#### **3.4.1 EMS as a Concept**

As a concept, systematic, proactive management of environmental affairs was quickly recognized as desirable. Some concern was expressed that an organization would publicize its EMS simply to show itself in a favorable light.

### 3.4.2 Registration

An organization can register its EMS to a standard; in the US this is almost always the ISO 14001 standard. The organization contracts with an independent firm, a registrar, to do this. The registrar has auditors under contract. These auditors examine the organization's documents and visit the organization's site to interview personnel and see the procedures in action. The auditors then make recommendations to the registrar, which decides whether the organization's EMS meets the standard. Surveillance audits are conducted periodically to ensure that the EMS remains in place and implemented.

This is an extremely brief summary of a process with its own complicated bureaucracy, procedures and guidelines. Registrars may be accredited by national bodies; the US accreditation body is the Registrar Accreditation Board in Milwaukee. There do not appear to be any significant numbers of EMSs being registered by non-accredited registrars.

The ISO 14001 standard itself is mute on the subject of registration. An organization can register its EMS through a third-party audit to gain credibility either to itself or to outside parties. Large manufacturers (Ford, GM, DaimlerChrysler) have instructed their first-tier suppliers to have registered ISO 14001 EMSs. Others (IBM, Nokia), have strongly suggested that their suppliers do the same. At this time, such market pressure seems to be a major driver to third-party registration, although there are some reports that firms register so that an outside party will keep coming in to ensure that the system remains in place.

A firm can also self-certify, that is, make public statements that they have an ISO 14001-compliant EMS, without any third-party auditors. While this may be of questionable value to parties outside the organization, an interesting point was raised in Advisory Committee discussions: an EMS that is self-certified but includes reporting of significant information to the public, may be of greater value to all external parties than a third-party registered EMS. In this context, it should be understood that ISO 14001 requires very little in the way of communication with external parties, essentially only the organization's environmental policy is required to be available.

### 3.4.3 Relationship between EMS use and regulatory compliance

The hypothesis that using, or certifying to, an EMS *guarantees* regulatory compliance is not true. The US standards-making body has stated that this is the case<sup>10</sup>, and preliminary results from the EMS research and anecdotal evidence indicate that this is the case.

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10 United States Technical Advisory Group to ISO TC 207, 1999: 207TAG/SC1/99/N19 Z1/99/N8

Having said that, can we expect *improved* regulatory compliance from firms that use an EMS? The answer to that seems to be yes.

In the ISO 14001 EMS, the organization has to have a process for knowing what laws it is subject to<sup>11</sup>. Meeting this requirement alone is a major advance, since DES continues to find that many individuals and organizations have no idea what environmental laws they are subject to. EMSs tend to remove compliance from chance or from the knowledge and inclinations of individuals who may be employed at any given time.

There was much discussion of what level of compliance can be expected from an organization with a third-party certified EMS. A presentation to the Advisory Committee by one registrar, NSAI Inc., helped address this issue. ISO 14001 requires that the organization have an environmental policy that includes a commitment to comply with relevant laws and regulations<sup>12</sup>. The auditor looks for objective evidence that this policy has been implemented. US national guidance requires that the auditor obtain this objective evidence, and not accept only “affirmative statements” from the organization that they comply with laws and regulations<sup>13</sup>. Further, ISO 14001 requires that an organization establish and maintain a procedure to evaluate their compliance<sup>14</sup>. The auditor will look for objective evidence that this has been done.

Unfortunately, anecdotal reports, including conversations with many different registrars, indicate that there are significant differences between the practices of different registrars and auditors, significant enough to leave real doubt as to how much assurance of improved compliance a registered EMS brings. NDEMS research does indicate a decreased level of non-compliances among EMS firms. EPA has funded separate research on the registration system by the National Academy of Public Administration<sup>15</sup>. That report contains specific recommendations on improving the registration system to gain consistency and clarity.

#### 3.4.4 EMSs in Enforcement

Given that EMSs directly deal with the matter of how organizations manage their environmental affairs, the enforcement branches of the environmental agencies have an interest. This has several aspects.

First, in several cases, vigorous enforcement has had the effect of convincing companies that they have to manage their environmental affairs more effectively, thus driving them to implement EMSs.

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11 ISO 14001:1996, Sec. 4.3.2

12 *ibid*, Sec. 4.2(c)

13 ANSI-RAB *Criteria for Bodies Operating Registration of Environmental Management Systems, E 3.2* Rev. October 25, 2000

14 ISO 14001:1996, Sec. 4.5.1

15 National Academy of Public Administration, *Third-Party Auditing of Environmental Management Systems: US Registration Practices for ISO 14001*, NAPA, May 2001, Washington, DC



An EMS might be considered evidence of an organization exercising due diligence or reasonable care over their environmental liabilities. While this could be interpreted in an enforcement context that “they should have known better”, it seems to be more usual that having a system in place that would prevent recurrences acts as a mitigating factor in computing penalties. DES and EPA enforcement policies provide for this second interpretation – both agencies encourage self-reporting and remediation of violations<sup>16</sup>,<sup>17</sup>. There are differences in the policies that each agency follows, but the goal remains the same: to improve compliance at the facility and prevent recurrences.

Environmental enforcement personnel are coming to the understanding that many violations are the direct result of ineffective management of environmental affairs, as opposed to malicious behavior. Therefore, organizations are being tasked to develop an EMS as part of enforcement settlements. DES has done this in one case, involving the state transportation agency, and EPA has done so in numerous cases. Significantly, the chief of DES’s RCRA enforcement section has reported<sup>18</sup> that inspections at a facility with an EMS in place are significantly easier, especially noting that records were easier to obtain at such a facility.

#### 3.4.5 Recognizing and Rewarding Good Behavior

This was a major focus of discussions. Exploration of this topic was a grant requirement.

Environmental agencies in the US have generally worked to modify environmental behavior using regulatory tools, which act to punish those who do not behave appropriately. This older tool has accomplished much, but it is only one tool. Incentives or rewards for good behavior have been lacking. It should be understood that withholding a punishment is not, strictly speaking, the same as an incentive.

The question to begin discussions was: Is it possible or desirable to offer positive incentives to organizations that show environmental performance beyond what is required in the law?

The short answer was yes. However, many detailed points emanated out from there.

- EMSs form a framework that allows a company to reliably achieve good or superior environmental performance, and to document that fact. As noted, it does not guarantee that performance.
- No one should be rewarded for simply complying with the law, but that is a necessary first step.

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16 EPA’s Audit policy: <http://es.epa.gov/oeca/auditpol.html>

17 DES Compliance Assurance Response Policy: <http://www.des.state.nh.us/legal/carp/>

18 verbal communication, 2000

- It was postulated that the existing framework of laws and regulations only address about 30% of the true environmental impact we have. This has two implications:
  - 'Beyond compliance' performance in regulated areas only pushes that 30% of the envelope outward. However, this may be necessary or desirable in certain circumstances.
  - There is a need to encourage better environmental performance in non-regulated areas. These non-regulated areas could include energy and water use, quantity of waste generation (as opposed to the *management* of that waste), sprawl, habitat loss, etc. It seems unlikely that these problems will be addressed using traditional regulatory tools. Arguably, many of these problems are not well suited to those tools. Further, it seems unlikely that the environmental agencies' resource levels will be increased to the extent necessary to address all these problems using regulatory tools. A new approach and new tools are needed.

A general agreement emerged that it would be desirable for DES to build a program that would offer positive incentives to companies in exchange for documented superior environmental performance. This would likely be a two-tier program. A lower tier would simply recognize organizations with good compliance histories and EMSs to ensure more reliable performance. A higher tier would be for the best performers, and could take the form of a site-specific contract that would in effect trade commitments for superior environmental performance for incentives from the agency. In general, the intent is to recognize good performers and to allow an organization the ability to *earn* its way into a more desirable relationship with the environmental agencies.

There was a great deal of discussion as to what incentives would be desirable. No consensus was reached. A list of possibilities includes:

- Public Recognition
  - For the higher performers this could include a site visit by the Commissioner or even the Governor. Such a site visit is very highly valued, as it brings the reward directly to the staff on the shop floor.
- Single point of contact within the agency
- Expedited permitting
- Self-permitting, or permit modification by notice
- Reduced or consolidated monitoring
- Reduced or consolidated reporting
- Lower inspection priority and/or frequency
- Acceptance of alternative technologies or methods
- Facility-wide permitting and/or emission limits
- Access to State warehouse, similar to that offered to non-profits

Other incentives were mentioned that seem to be outside of DES's jurisdiction at this time:

- Tax credits for environmentally-related equipment or purchases
- Income tax deductions for environmentally-related expenses
- Preferential access to government-backed loans

It seems most likely that no consensus was reached due, at least in part, to the variability of what would be desirable to different organizations. Similarly, superior environmental performance cannot be defined in a broad sense. Both performance and incentive are specific to the location.

DES is currently working internally to develop this concept further to present a program proposal. The State legislator on the Advisory Committee stated that, in her opinion, such a proposal would get a good hearing at the State House.

While these discussions were taking place, EPA announced and started a similar program, called National Performance Track<sup>19</sup>. EPA personnel explained their program at Advisory Committee meetings. For DES purposes, it seems desirable to maximize the agreement between state and federal programs, with a goal of reciprocity. It should also be noted that several other states, notably Wisconsin, New Jersey and Oregon have experience with such programs. Information on National Performance Track and other states' programs was distributed to the Advisory Committee.

During Advisory Committee discussions, it was asked that if such a program – offering incentives in addition to punishments - represents a real change in how the agency conducts its business, why has it raised so little public interest? After all, the public seems to be clearly in favor of vigorous environmental protection. Two explanations seem possible. First, that the concept is obviously desirable and therefore self-evident. An Advisory Committee member offered a possible second explanation. In New Hampshire, a culture of collaborative problem solving in environmental matters is long standing. This implies that agency-company relations have been less adversarial, and this new incentive concept arises, at least in part, out of a recognition that being adversarial is not always the best way to address subtle and complicated environmental issues and challenges.

### **3.5 Other DES EMS-Related Activities**

During the project period, DES staff also took advantage of many opportunities within New Hampshire to educate and promote the EMS concept and the ISO 14001 EMS in particular, including:

- EMS sessions at the annual NH Pollution Prevention Conference.

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19 See <http://www.epa.gov/performancetrack/>

- “This is an EMS” presentations at local business-training sessions.
- Basic EMS training as part of the University of NH’s P2 Internship training program.
- Support to the NH Small Business Development Center’s EMS training efforts.
- A presentation on how to assist small businesses build EMSs at a national Small Business Assistance Program conference<sup>20</sup>.
- Responding to telephone requests for information.
- Development and promulgation of DES policy encouraging the use of EMS<sup>21</sup>.
- Advocacy with DES staff and management. Coordination with DES’s Pollution Prevention Program was particularly good.

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20 This presentation is posted at <http://www.epa.gov/ttn/sbap/conf99a.html>. See the agenda for April 19, 1999.

21 See <http://www.des.state.nh.us/factsheets/co/co-11.htm>

## **4. Results and Lessons Learned**

### **4.1 General Lessons and Results**

The first lesson learned is that systematic, proactive management of environmental impacts through an EMS is better than reactive crisis-driven management.

Beyond that, perhaps the most significant lesson learned is that EMS development is a significant undertaking. The time and effort necessary to accomplish this must not be underestimated. Material resources, both time and money, are required, but non-material resources are needed as well. The organization trying to implement an EMS for the first time must have a clear understanding and acceptance of the plan-do-check-act management style to successfully bring environmental management beyond single-project status.

Having stated that, firms that implement EMS report anecdotally that the effort pays for itself through cost savings. A payback period of one year is most commonly mentioned. Most of the cost savings appear to be in non-regulated areas such as energy use. The least economically favorable result known to DES is that the EMS effort was a break-even proposition. Even in that case, the firm reported that the effort was worth it because with the EMS in place, the firm had better relations with the environmental agencies and with their neighbors.

DES's program was originally set up to design and implement the participating firms' EMSs over a six to eight month time frame. This was not accomplished, for various reasons described in this report. It should be noted however, that a firm in New Hampshire, not participating in the pilot study, reported to DES that it took them six months to implement their EMS. This is a small electronics component manufacturer, which was ISO 9000 certified when they started. They were motivated to do this when their major customer indicated in writing that registration to ISO 14001 would determine whether that customer would continue to use this manufacturer as a supplier. As a manufacturer with a single product line, it may be assumed that their environmental aspect and impact list was fairly short. The company was also relatively new, so the existing management culture was less ingrained.

One interesting note is that in the course of DES's EMS training it became necessary to change the focus from helping the participating firms proceed to convincing them to stop the planning efforts. That is, it was a challenge to convince them that what they had was good enough to start with. A lesson here is that it is more important to start one's EMS and then improve it, rather than trying to build a perfect system and delay implementation. Waiting for a perfect system essentially results in never getting started.

Whether or not a firm explicitly starts its EMS while practicing a plan-do-check-act management style, the effort to implement an EMS involves hundreds, if not thousands,

of staff hours. Providing the research data, in addition to the effort needed to implement the EMS, is a significant burden that has contributed to facilities dropping out of the research program in all of the participating states.

Since 1997, awareness of EMSs and ISO 14001 has become much more common in NH. DES's activities, galvanized by this grant, have been important to achieving this increased awareness.

## 4.2 Small Businesses

DES's grant work plan focused on small businesses. Through the work of this project, DES has learned that EMS development for small businesses is quite challenging. The chart below illustrates the issues:

Pros	Cons
Smaller structure makes communication easier	Communication structure is sub-conscious and un-documentable.
Less organizational inertia and history to impede change – more flexibility	No organization
Staff often empowered to make changes	Staff resistant to the concept of documented procedures
Decision makers easy to identify	Decision makers often have no 'management' skills
	No resources to devote to system development

The last two issues in the "Con" column merit further discussion. The two key issues seem to be the lack of resources in the small business environment and the fact that small business managers/owners most often have no management training. A lack of familiarity with the "Plan-Do-Check-Act" or TQM approach appears to be a fatal flaw for anyone looking to develop an EMS.

Good intentions do not overcome this. A person with good intentions will address individual issues well, but putting a system into place or comprehensively managing all environmental impacts becomes a matter of chance. A sufficiently talented person may be able to address all of an organization's environmental concerns, but the matter is then dependent on the individual.

Resources become more and more of an issue as an organization becomes smaller. When the CEO is also the production manager, the human resources administrator, and

the health and safety officer, there is simply no time to step back to assess and build a management system.

Specific parts of the ISO 14001 EMS which seem to be problematic for smaller businesses are:

- Development of standard operating procedures for operational control
- Identification and ranking of environmental aspects and impacts
- Establishing a formal management review process
- Establishing a document control system
- Establishing communication procedures, for both external and internal communication

Originally, it was anticipated that the DES project could produce a “small business EMS” template. This proved to be infeasible. Other assistance tools are available though. These include:

- Training consortiums, similar to the DES-offered training and training recently offered by NH’s Small Business Development Center. Several small companies band together to share training costs and collaborate on implementation.
- Assistance from non-traditional sources such as mentors. This would also include customers, universities or non-profit groups.
- Sector-specific EMS templates. One example of a program developing these is EPA’s Design for the Environment program<sup>22</sup>.

These could address the issue of resource limitations. To address insufficiency of management skills, ways should be sought to provide management training to small business owner/operators.

#### **4.3 Specific Notes on New Hampshire Participating Firms**

The first group of firms participating in the DES study did not have a starting point of having an ISO 9000 quality management system in place. This meant that extra time was needed to develop a comfort level with the concepts of systematic management. Further, each of these firms was involved in the project on a strictly voluntary basis; i.e., they were doing it because it was the right thing to do. While laudable, this meant that other issues would often take priority over EMS development.

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22 See <http://www.epa.gov/opptintr/dfe/>

Each of these three firms told DES that they would not have developed an EMS without the state coming forward to assist them.

The company in this first group that progressed the furthest was the one with the clearest commitment from upper management, and had staff from throughout the organization involved in EMS development. The other two companies in this group seldom involved more than one person in EMS development, and as a result development was slow.

On the other hand, the two firms in the second group already had ISO-9000 systems in place. Both are suppliers to the automotive industry. They joined DES's project before the major automotive manufacturers mandated EMS development by their suppliers, but they were both aware enough of conditions to know that such a requirement was on the horizon. Thus they had motivators that the other three lacked, and they had greater knowledge of management systems. However, these two firms did not proceed at the 'six-month' pace originally envisioned. Reasons for this can be traced in corporate management styles and in personnel turnover issues.

One firm's corporate management style is heavily invested in lean manufacturing techniques and the rigors of delivering products within a just-in-time inventory system. Focus at the plant level is at the day-to-day level, even at the shift level, and focus on broader management planning and execution is difficult to achieve. Support from corporate management was questionable for much of the project period, and involvement from other (i.e., outside of the environmental department) personnel has been highly variable. However, the environmental manager who led the effort was able to involve some people from other departments in the plant, and achieved some success. Late in the project period, corporate management became involved to place ISO 14001 EMSs at all plants within the corporation, and progress has quickened.

The other firm's management style at the upper levels was entirely different from the first one's, and certainly appeared to be more progressive. However, the environmental manager here did not seem to involve other people in EMS development. EMS development appeared to be stalling after the point of ranking environmental impacts, when that environmental manager left the firm. It took almost four months to fill the position, and it is not known at present how EMS development will proceed. Alone of the five participants, this firm had not completed any of the research data protocols (as of mid-2002). They began working on the Baseline Protocol in the late spring of 2000 and on the EMS Design Protocol in the fall of 2000. DES's project manager has met with them four times to move the matter along, but the time required to fill out the Protocol and personnel turnover have resulted in slow progress.



#### 4.4 Summary of National Research Results

As noted, DES's project is part of a larger research effort. Results of that research have been published<sup>23</sup>. A brief summary of results to date, based on Baseline data describing the firms that implement EMSs and EMS Design data describing the nature of their EMSs, is included below:

1. EMSs are attractive to small businesses and government agencies, not just large corporations.
2. Facilities implementing EMSs are not idiosyncratically "green" to begin with.
3. Pollution prevention plans make a difference to EMS practice.
4. Corporate policies matter.
5. Regulatory expectations are the strongest external drivers for EMS implementation.
6. For businesses, internal drivers are more important than external pressures.
7. Market forces are also important, but in varied ways.
8. Government assistance matters, especially to government facilities and privately owned (as opposed to publicly traded) companies.
9. Organizational culture is a powerful influence.
10. Environmental Health and Safety managers and staff almost always drive the EMS design process.
11. Cross-functional work teams to address environmental management appear to be an important benefit of EMS adoption.
12. External stakeholders are rarely invited into the EMS development process. The ISO 14001 standard requires that the organization's environmental policy (only) be made available to outside parties. Significantly, one investigator found that about 1/3 of a sample of firms with ISO registered EMSs refused to share their environmental policy<sup>24</sup>.

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23 This list is excerpted from the Executive Summary of *Drivers, Designs, and Consequences of Environmental Management Systems, Research Findings to Date From the National Database on Environmental Management Systems* March 12, 2001, posted at <http://ndems.cas.unc.edu/>

24 Barton, Alexandra (1999) *An Analysis of ISO 14001 Environmental Policy Statements*. Report prepared for Barry Korb, USEPA, Washington, DC. Cited in *Drivers, Designs, and Consequences...*,

13. The scope of an EMS may or may not cover an entire facility.
14. There is great variation in how environmental activities, aspects and impacts are categorized, described and ranked.
15. Ranking the significance of environmental impacts is based more often on managerial judgment than on formal ranking processes. Regulatory compliance is heavily weighted.
16. Positive impacts are rarely considered.
17. There is also great variations on how objectives and targets are set. The data to date indicate that firms are setting short-term objectives and are not addressing larger environmental issues such as design for the environment, life-cycle analysis or product stewardship.

One possible public policy conclusion from these preliminary findings is that the existence of an EMS is not sufficient to provide surety of acceptable environmental performance, the *content* of the EMS must be examined as well.

## 5. SUMMARY

Through its participation in this project and through the outreach and networking that DES staff has done, DES has learned that leading organizations have changed the way they address their environmental affairs through the application of systematic environmental management systems. These organizations use sophisticated systems to manage their environmental affairs, both in regulated and un-regulated areas. Anecdotally, these organizations report that this proactive environmental management system produces net economic gains for them. This economic gain is seen as both cost avoidance through better liability control, but also as explicit (and significant) cost savings. They usually report these cost savings in areas that are not regulated, but are still of concern to DES, such as energy use, water consumption and the quantity of waste generated.

Now, leading companies do not view compliance with laws and regulations as a goal, but as a given. They have learned that 'deny, delay, and litigate' as an environmental management strategy is not effective. These leaders now view environmental performance in a broader way, and understand that improving environmental performance leads to improved economic performance. Some are vigorously promoting full environmental sustainability.

In order for environmental agencies to take advantage of this change in business' attitudes and encourage better environmental performance in the broadest possible sense the environmental agencies can reach for these goals:

- Encourage better environmental performance in areas that current regulatory programs have not succeeded at, which would include: sprawl, non-point source water pollution, energy use, climate change, water consumption, habitat loss, etc.
- Explicitly shift limited government resources away from high-performing organizations and toward those whose performance needs to be improved.

New programs are needed to accomplish these goals. This would involve recognizing and rewarding good performers.

Goals for organizations that would participate in such a program would be to:

- Improve their economic performance while improving their environmental performance.
- Achieve recognition as good performers
- Improve their relationships with the agencies and with their neighbors.

Many agencies have already developed incentive programs of various types intended achieve these goals. Arizona, California, Colorado, Georgia, Idaho, Illinois, Indiana, Maine, Michigan, New Jersey, New Mexico, North Carolina, Oregon, South Carolina, Texas, Virginia, and Wisconsin are some of the states that have developed such programs. USEPA has developed such a program<sup>25</sup>, the National Performance Track program. In general, the intent is to recognize good performers and to allow an organization the ability to *earn* its way into a more desirable relationship with the environmental agencies. A relationship of collaborative problem solving with appropriate trust is developed.

The original goal of having data from a number of organizations to answer the questions related to whether, and how, an EMS affects an organization's environmental performance is only beginning to be reached. However, some results of the research have been published, and the work is continuing. Even without problems in building the database, the original two-year timeframe may have been too short to see any changes in environmental performance attributable to EMSs.

However, even if data is only beginning to be available, DES has gained knowledge of EMSs and their use by organizations. Because of that knowledge, DES has recognized that organized, pro-active and comprehensive management of environmental impacts through an EMS is desirable, and has a written policy encouraging the use of EMSs. However, it appears if the EMS is intended to address public policy needs, the content of each EMS has to be examined.

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25 Information on the EPA's program, and a summary of state programs, is at <http://www.epa.gov/performancectrack/>